PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
WOP0277		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB 03/04058	18.09.2003	24.09.2002
International Patent Classification (IPC) or both national classification and IPC		
A47L9/04		
Applicant		
DYSON LTD et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
20.04.2004	15.02.2005
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/04058

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1, 3-14	as originally filed
2	received on 31.01.2005 with letter of 31.01.2005

Claims, Numbers

17-20	as originally filed
1-16	received on 31.01.2005 with letter of 31.01.2005

Drawings, Sheets

1/9-9/9	as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   - ☐ the description, pages:
   - ☐ the claims, Nos.:
   - ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

   ☐ the entire international application,

   ☒ claims Nos. 20

   because:

   ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

   ☒ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. 20 are so unclear that no meaningful opinion could be formed *(specify)*:

   see separate sheet

   ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

   ☐ no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

   ☐ the written form has not been furnished or does not comply with the Standard.

   ☐ the computer readable form has not been furnished or does not comply with the Standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-19
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-19
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The general references to the description and drawings used in **claim 20** are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer, thereby rendering the definition of the subject-matter of said claim so unclear (Article 6 PCT) that no opinion with regard to novelty, inventive step and industrial applicability can be established. Furthermore, according to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: DE 198 26 041 C (DUEPRO AG) 4 November 1999 (1999-11-04)

D2: PATENT ABSTRACTS OF JAPAN vol. 013, no. 536 (C-660), 29 November 1989 (1989-11-29) & JP 01 221128 A (MATSUSHITA ELECTRIC IND CO LTD), 4 September 1989 (1989-09-04)

D3: DE 195 07 528 A (WESSEL WERK GMBH) 5 September 1996 (1996-09-05)

D4: PATENT ABSTRACTS OF JAPAN vol. 1999, no. 01, 29 January 1999 (1999-01-29) & JP 10 286202 A (TEC CORP), 27 October 1998 (1998-10-27)

The document D2 and D3 are regarded as being the **closest prior art** to the subject-matter of claim 1, and disclose

(document D2) a vacuum cleaning head comprising a housing, an agitator 2 for agitating a floor surface which is rotatably mounted in the housing, an air turbine 4 for driving the agitator 2, an air inlet 25 for admitting air to the turbine 4, and a control (14, 15) for preventing rotation of, or reducing the speed of rotation of, the agitator (cf. abstract, lines 15-17), wherein **the control is responsive to the flow of air to or through the turbine** (cf. abstract, lines 13-17)

(document D3) a vacuum cleaning head comprising a housing, an agitator 3 for agitating a floor surface which is rotatably mounted in the housing 4, an air turbine 1 for driving the agitator 3, an air inlet for admitting air to the turbine 1, and a

control (cf. Abstract) for preventing rotation of, or reducing the speed of rotation of, the agitator 3, wherein **the control is responsive to the speed of rotation of the turbine** (cf. column 2, lines 37-57).

The **problem** to be solved by the present invention may therefore be regarded as the provision of a vacuum cleaning head, wherein the speed of rotation of the agitator can be more easily maintained or controlled.

Solution. The claimed head is provided with a turbine air inlet which is an air inlet separate from the suction inlet.

In the cited prior art heads wherein the air is drawn through the main suction inlet that engages with the floor and this airflow is then drawn through the turbine, the turbine can easily become fouled by the dirty airflow.

D4 discloses a cleaning head provided with a turbine driven tool wherein the air inlet for the turbine is separated from the main suction inlet. Contrary to the claimed cleaning head, the turbine control in D4 is responsive to the air flow through the main air inlet. An air control as disclosed in D2 or D3 is not applicable to a construction like the one of the cleaning head disclosed in D4.

Claim 1 is therefore novel and inventive and has industrial applicability in the sense of Article 33(2)(3)(4) PCT.

Claims 2-19 concern particular embodiments of the vacuum cleaning head defined in claim 1 and as such also meet the requirements of Article 33 (2)(3)(4) PCT.

Re Item VII

Certain defects in the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D2 and D3 is not mentioned in the description, nor is this document identified therein.

Independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT.

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

tools, the solutions proposed for dirty air turbine-driven tools are unsuitable for use in clean air turbine-driven tools.

Accordingly, the present invention provides a vacuum cleaning head comprising a housing having a suction inlet, an agitator for agitating a floor surface which is rotatably mounted in the housing, an air turbine for driving the agitator, a turbine air inlet, separate from the suction inlet, for admitting air to the turbine, and a control for preventing rotation of, or reducing the speed of rotation of, the agitator, wherein the control is responsive to the speed of rotation of the turbine, or flow of air to or through the turbine.

The control can take the form of a mechanical arrangement which directly responds to the speed of rotation of the turbine. A centrifugal braking mechanism can be fitted to the drive shaft from the turbine, with braking elements moving radially outwards to act on a braking surface surrounding the drive shaft when the speed of rotation of the turbine exceeds a predetermined limit. Alternatively, a centrifugal clutch can be fitted in the drive shaft from the turbine. These arrangements have the advantage of providing the user with a warning noise when they operate.

More preferably, the control is a valve which is movable between an open position, in which it admits air to the turbine, thereby allowing the turbine to drive the agitator, and a closed position in which it prevents air from reaching the turbine, thereby preventing the turbine from driving the agitator.

The control can comprise a movable part having an interior volume which communicates with the main airflow path to the turbine, the movable part being responsive to a pressure difference between the interior volume and ambient air.

Preferably the control is also movable into the inoperable position by a user, such as when a user decides to use the cleaning head on a hard floor or delicate surface. Providing one control which can either be manually or automatically operated to turn off the agitator has a considerable benefit in making the cleaning head easier to use.

Claims

1. A vacuum cleaning head comprising a housing having a suction inlet, an agitator for agitating a floor surface which is rotatably mounted in the housing, an air turbine for driving the agitator, a turbine air inlet, separate from the suction inlet, for admitting air to the turbine, and a control for preventing rotation of, or reducing the speed of rotation of, the agitator, wherein the control is responsive to the speed of rotation of the turbine, or flow of air to or through the turbine.

2. A vacuum cleaning head according to claim 1, wherein the control is movable between an open position, in which it admits air to the turbine, and a closed position in which it prevents air from reaching the turbine.

3. A vacuum cleaning head according to claim 2, wherein the control is biased into the open position.

4. A vacuum cleaning head according to claim 2 or 3, wherein the control is also movable into the inoperable position by a user.

5. A vacuum cleaning head according to any one of claims 2 to 4, wherein the control comprises a movable part having an interior volume which communicates with the main airflow path to the turbine, the movable part being responsive to a pressure difference between the interior volume and ambient air.

6. A vacuum cleaning head according to claim 5, wherein the interior volume of the movable part communicates with the main airflow path to the turbine via a restricted airflow path.

7. A vacuum cleaning head according to claim 6, wherein the restricted airflow path comprises an apertured plate.

8. A vacuum cleaning head according to any one of claims 5 to 7, further comprising means for drawing air from the interior volume of the movable part.

9. A vacuum cleaning head according to claim 8, wherein the drawing means comprises a second turbine.

10. A vacuum cleaning head according to claim 9, wherein the second turbine forms part of the rear face of the turbine.

11. A vacuum cleaning head according to claim 10, wherein the second turbine comprises depressions and ribs on the rear face of the turbine.

12. A vacuum cleaning head according to claim 8, wherein the drawing means comprises a venturi in the airflow path upstream or downstream of the turbine, the interior volume of the movable part communicating with the venturi.

13. A vacuum cleaning head according to any one of claims 5 to 12, further comprising a valve for admitting air into the interior of the movable part whereby to reopen the turbine air inlet.

14. A vacuum cleaning head according to any one of claims 2 to 13, further comprising a seal for sealing the turbine air inlet in the closed position.

15. A vacuum cleaning head according to any one of claims 2 to 14, further comprising a valve for admitting air to the cleaning head whereby to reopen the turbine air inlet.

16. A vacuum cleaning head according to claim 15, wherein the valve admits air to a region downstream of the turbine.